

# RESERVE COPY

## PATENT SPECIFICATION



Application Date: Dec. 20, 1924. No. 30,640/24.

249,219

Complete Left: Sept. 21, 1925.

Complete Accepted: March 22, 1926.

### PROVISIONAL SPECIFICATION.

#### Improvements in or relating to the Radiusing of Rollers for Roller Bearings and like Cylindrical Articles.

I, CHARLES HENRY LINES, of "Torrington", Kineton Road, Olton, Birmingham, British subject, do hereby declare the nature of this invention to be as follows:—

This invention comprises certain improvements in or relating to the radiusing of the end of rollers for roller bearings and such like articles, and it has for its object a novel process whereby the rollers or the like are radiused in a cheap and efficient manner.

According to the present improvements the rollers are, whilst the metal is, advantageously, in a soft condition, given repeated blows or taps so that the corners of metal at the ends of the rollers are spread to form a radius. The blows are, conveniently given by shaking the rollers in a rotating or reciprocating barrel into which is placed such articles as hardened steel balls. The rollers are then suitably finished and hardened, after which they are ground to size.

In the case of steel ball bearing rollers, cylindrical blocks of metal, which may have been cut from a length of bar, are first annealed and are then placed in a shaking barrel, the barrel being preferably filled to one third its capacity with the soft rollers and with hardened steel balls, the balls being of approximately the same diameter as the rollers. A suitable over size is allowed on the diameter and length of the soft roller. The shaking barrel may be of any convenient shape in order that the steel balls and rollers will knock against one another when the barrel is rotated, the rollers also sliding down the barrel and striking a surface thereof. The barrel may be octagon, square, or any polygon shape in

cross section, or may be cylindrical with internal webs or flanges or of any other shape which will give a lifting and dropping action to the contents. The barrel may also be formed of cast iron, wood or other suitable material. The barrel is rotated at a suitable speed and for a sufficient length of time until the metal has been pressed and spread in at the corners to a sufficient extent which will leave a radius when the roller has been finished to the required size both diametrically and longitudinally. The rollers may also be run in the barrel with the steel balls removed. The rollers are then hardened, and such hardened rollers are placed with hardened balls into the usual type of ball reducing barrel into which is placed a cutting agent such as the material sold under the registered trade mark "aloxite" and paraffin in proportion of half a pound of aloxite to one gallon of paraffin. The barrel is run until the rollers are of the required size diagonally with the radius formed to size and shape, when they are polished in the usual ball polishing barrel. The rollers can then be ground to the required diameter and also ground flat at the ends to the required size, whilst leaving a radius at the junction of the flat and horizontal surfaces.

Rollers and sleeve pieces of aluminium, brass, or any other metal, may be similarly radiused, and in the case of sleeve pieces the radius may be produced both internally and externally.

Dated this 18th day of December, 1924.

J. E. S. LOCKWOOD,  
Patent Agent for the Applicant,  
3, New Street, Birmingham.

## COMPLETE SPECIFICATION.

## Improvements in or relating to the Radiusing of Rollers for Roller Bearings and like Cylindrical Articles.

I, CHARLES HENRY LINES, British subject, of "Torrington", Kineton Road, Olton, Birmingham, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention comprises certain improvements in or relating to the radiusing of the ends of rollers for roller bearings and like cylindrical articles, and it has for its object a novel process whereby the rollers or the like are radiused in a cheap and efficient manner. According to the present improvements the rollers are, whilst the metal is advantageously in a softened condition subjected to an action so that the corners of the metal at the ends of the rollers are pressed or spread to form a radius by giving repeated blows or taps to the corners. The blows are, conveniently, given by shaking the rollers in an agitator such as a rotating or reciprocating barrel into which may be placed such articles as hardened steel balls. The rollers are then brought to size diagonally with the radius formed to size and shape by running them in a reducing barrel.

In order that the invention may be clearly understood and readily carried into effect, reference may be had to the accompanying drawings on which:—

Figure 1 is a side elevation of a cylindrical block of metal adapted to form the roller of a roller bearing.

Figure 2 is a central longitudinal section of the cylindrical block shown by Figure 1.

Figure 3 is an end elevation of the block shown by Figure 1.

Figure 4 is a side view of the block shown by Figure 1 after such block has been run in a shaking barrel in the annealed condition.

Figure 5 is a longitudinal section of the block shown by Figure 4.

Figure 6 is a side elevation of the block shown by Figure 4.

Figure 7 is a side elevation of a finished roller.

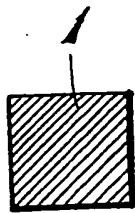
Figure 8 is a central longitudinal section, and

Figure 9 is an end elevation.

In the case of steel bearing rollers, cylindrical blocks of metal 1, which may have been cut from a length of bar, are

first annealed and are then placed in a shaking barrel, the barrel being preferably filled to one third its capacity with the soft rollers with which is preferably included hardened steel balls, the balls being of approximately the same diameter as the rollers. A suitable over size is allowed on the diameter and length of the soft roller. For rollers over half an inch in diameter an allowance of +.010 is given on the diameter and length of the rollers and for rollers under half an inch in diameter an allowance of +.006 on diameter and length. The shaking barrel may be of any convenient shape in order that the steel balls and rollers will knock against one another when the barrel is rotated, the rollers also sliding down the barrel and striking a surface thereof. The barrel may be octagon, square, or any polygon shape in cross section, or may be cylindrical with internal webs or flanges or of any other shape which will give a lifting and dropping action to the contents. The barrel may also be formed of cast iron, wood or other suitable material. The roller may also be run in the barrel with the steel balls removed. The barrel is rotated at a suitable speed and for a sufficient length of time until the metal has been pressed and spread in at the corners 2 to a sufficient extent which will leave a radius when the roller has been finished to the required size both diametrically and longitudinally. The suitable speed of an octagonal barrel 2' 9" by 2' 9" is 60 revolutions per minute. The barrel may be run for twenty to thirty hours and the rollers are removed from the barrel when they are +.003 diagonally above the required size. When the barrel is reciprocated it may have a stroke of 6 inches and 60 strokes per minute. The rollers are then hardened, and such hardened rollers are placed with hardened balls into the usual type of ball reducing barrel into which is placed a cutting agent such as the material sold under the registered trade mark "aloxite" and paraffin in proportion of half a pound of "aloxite" to one gallon of paraffin. The barrel is run until the bumping marks on the radius are removed and the rollers are of the required size diagonally with the radius formed to size and shape, when they are polished in the usual ball polish-

[This Drawing is a reproduction of the Original on a reduced scale.]



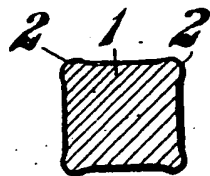
*Fig. 2.*



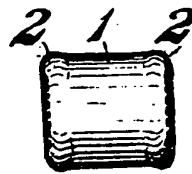
*Fig. 1.*



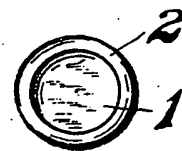
*Fig. 3.*



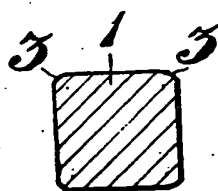
*Fig. 5.*



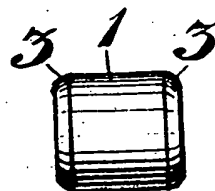
*Fig. 4.*



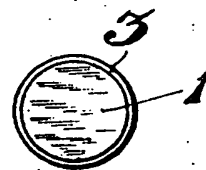
*Fig. 6.*



*Fig. 8.*



*Fig. 7.*



*Fig. 9.*

ing barrel. The rollers are then ground to the required diameter and also ground flat at the ends to the required size, whilst leaving a radius 3 at the junction of the flat and horizontal surfaces. The rollers may, after being radiused in the shaking barrel, be placed in the usual type of ball reducing barrel and reduced in a soft state before hardening.

10 Rollers which have been roughly or partially radiused by any other process may have the radius finished by this invention.

Rollers and sleeve pieces of aluminium, brass, or any other metal, may be similarly radiused, and in the case of sleeve pieces the radius may be produced both internally and externally.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. The process of radiusing the ends of rollers for roller bearings and like cylindrical articles whereby the corners at the ends of the rollers or the like are pressed or spread to form a radius by means of repeated blows or taps.
2. The process of radiusing the ends of rollers for roller bearings and like cylindrical articles whereby the corners at the

ends of the rollers or the like are pressed or spread to form a radius by means of repeated blows or taps obtained by running a quantity of rollers in a shaking barrel or other agitator.

3. The process of radiusing the ends of rollers for roller bearings and like cylindrical articles whereby the corners at the ends of the rollers or the like are pressed or spread to form a radius by means of repeated blows or taps obtained by running a quantity of rollers in a shaking barrel along with a quantity of steel balls.

4. The process of radiusing the ends of steel rollers for roller bearings whereby the steel rollers are annealed and the corners at the ends of the rollers pressed or spread to form a radius by repeated taps or blows in a shaking barrel or agitator, after which the rollers are hardened and finished to size diagonally in a reducing barrel preparatory to grinding the rollers to the required size diametrically and longitudinally.

5. The process of radiusing the ends of steel rollers and like cylindrical articles, substantially as herein set forth.

Dated this 16th day of September, 1925.

J. E. S. LOCKWOOD,  
Patent Agent for the Applicant,  
3, New Street, Birmingham.